AMERICAN JOURNAL OF OPTOMETRY

VOL. 7 NO. 3

VISUAL SURVEYS IN SCHOOLS*

Ernest Petry, Opt. D., F. A. A. O.
Rochester, N. Y.

This paper shall be an attempt to establish an unbiased viewpoint regarding the importance of eyesight surveys of school children on the basis of its influence on future society, and suggestions of methods by means of which the service involved may be provided.

It seems futile to waste words on the establishment of the fact that it is important to the future of the nation that the eyes of the children should be surveyed, analyzed and corrected.

However, we find opponents to all worthy enterprises, and with this in mind a few statements of the benefits to be derived from eyesight surveys in our schools seem in order.

Much has been said and written about sending the whole child to school, but practically all attempts in this direction have been limited to a concern of the child's general physical condition.

Health department officers, hygienists, physical educators, school nurses and teachers have carried on a very creditable program of activity in this field. It is true also, that in this general program the eyesight of the child was given some attention, but investigation will prove that with our present knowledge of the subject this phase of the work is woefully inefficient, since it is limited to the recording of acuity only. In addition, it might be mentioned further that because in many instances the methods employed for determining visual acuity are faulty (in that the records may in some cases indicate the memorizing ability of the child with subnormal vision who has heard several of his classmates who preceded him recite the letters of the visual acuity chart as the health officer, nurse or teacher made the record) all of this work is limited to only one class of eye defects.

It is not intended by this statement to indicate that there is a wilful neglect on the part of those in charge to discriminate against the eyesight phase of the physical well-being of the child because it is a fact that in most programs as much time is allotted to the eye

*An abridgement of the material presented before the American Academy of Optometry at Chicago, Ill., Dec. 2nd, 1928.

as to any other organ. The question might then be asked, "Why give more time to the eye?"

In our search for an answer to this question, we might counter it with the question, "Why does the child go to school?"

Our natural answer to this is that the child goes to school to be educated. The process of education consists of conveying messages to the child's mind through its sense organs, and the many analyses which have been made in this field arrive at the same conclusion, and that is that ninety per cent of all education comes through the eyes, seven per cent through the ear, and the remaining three per cent through the other senses.

Since nine-tenths of the child's education is relatively dependent upon the normal functioning of the visual organ, it seems justifiable to argue for a little more time in the process of determining the child's fitness for the desired educational accomplishment.

Does the visual acuity measurement alone meet this determinative requirement? We must admit that if there were no involvements, a normal visual acuity would suffice, but unfortunately visual acuity expresses a mere accomplishment and does not note the effort expended. Allowing this thought to linger for a moment, we become interested in the relative effort expended in the process of registering visual impressions be they blurred or definite.

This brings us to the thought that although normal visual acuity is a desirable attribute, it is by no means an essential to accomplishment, since we have many experiences with children of subnormal visual acuity who have a greater mental accomplishment to their credit than have others who are blessed with the normal visual acuity.

The question then resolves itself into one of relative effort expended, and through it an involvement of the entire group of functions by whose instrumentality education is promoted through our eyesight.

Thus, and since, eyesight is a binocular function, the real question in hand, not only with the child entering school but in the entire enterprise of conservation of vision, is one which concerns the efficiency of the binocularity of our seeing sense.

With refraction and its myopia, hyperopia, and astigmatism, with accommodation and its abnormal amplitudes and spasms, with convergence and ocular rotations and their ductions, tonicity, phorias and tropias, with perception and its amblyopia suspenopsia, and stereopsis, and with all of these severally involved in the efficiency of the binocularity of our seeing sense, we may readily conjure up in our minds what the problem of an ideal survey of a school child's eyesight comprises.

The time element involved makes such a program entirely im-

possible at this writing, and it is a question whether the time will ever come when the man power will be available to carry it to a successful fulfillment. We thus face the necessity of a compromise process in deference to the ideal.

In considering a compromise method of meeting the requirements of a survey of school children's eyesight, we must not lose sight of the fact that future society in general will benefit only in such proportion as the child's eyesight efficiency will permit it to not only gain benefits of the excellent programs provided for it by the boards of education, but also through the education acquired to gain respect for such accomplishment and thus learn to apply it.

Lest I be misunderstood, let me call attention to the fact that the problem of surveying, supervising and catering to the eyes of the school children is too important an undertaking to make it justifiable for any group, sect, or cult to overlook its value, or, on the other hand, to claim it as its own. To you, my friends, I want to say emphatically the problem of the eyesight of the school child is not one for optometrists alone, nor could the number of available optometrists provide the service required for such surveys, were it demanded of them, in the near future, in any city of over 50,000 inhabitants and in many smaller localities as well.

Furthermore, I would say that if nothing else were considered, and all available refractionists, regardless of professional affiliations, were interested, the time element involved makes the immediate inauguration of eyesight surveys in schools ill advised on a wholesale scale unless a justifiable compromise can be evolved.

This factor, however, does not minimize the exigency which the problem of the school child's eyes presents to us as optometrists, and for that reason it seems advisable for each refractionist, in view of the probable impossibility to launch a wholesale movement for the benefit of these children to devote himself individually, or in association with small groups of refractionists, to the local problem as it presents itself and can be best handled in their community.

It may be of interest to make mathematical analysis of the scope of the problem and concerning the probable man power available to administer this work.

On an average, a community or state has approximately one-sixth of its population in public and parochial schools. Were optometrists to undertake this survey without co-operation from the ophthalmologists, we would in all probabilities find that if an optometrist is not a member of his state society he cannot be interested in school survey work to the point of taking part therein.

Let us then take New York state as an example, where the concentrated population would make these surveys more workable than in states of more scattered population. Thus, with a population of twelve million there should be approximately two million school

children in this state, and with 850 members in our State Optometry Society, each devoting six hours per week to the task thirty-four weeks of the year, it would be necessary to make survey examinations at the rate of one every five minutes.

Before we decide whether five minutes is sufficient for the type of survey that would meet our approval, let us look into the man power element a little further by asking the question, "Would the 850 men previously referred to all take part in such a plan?"

The answer must without hesitation be no, for the reasons that some would not because of their lack of interest, some could not because of their inability to comply with the requirements of time and ability, and others, by virtue of their not being in private practice could not, even though they willed to do it.

The fact of the matter is that where we would probably need a thousand men as a minimum there would be less than five hundred available. Even though a harmonious co-operation between optometrists and ophthalmologists could be established for the carrying on of this work the actual number of practitioners who would volunteer to serve on the basis of six hours per week would still be insufficient.

For the purpose of presenting another picture in this problem as it affects the man power, let us suppose that in New York state we could enlist a thousand men in this enterprise. This would mean, on the basis previously suggested, each child would receive approximately six minutes of attention. Assuming for the time being that this is sufficient, it would further mean that the selective surveys covering the period of one year would reveal the fact that upward of 700,000 children would be advised to have determinative eye examinations made. This figure is based on the statistical facts that one out of every three children in our schools today is in need of eyesight attention.

With this additional volume of office practice divided in due proportions among all refractionists, regardless of whether or not they were associated in its cause, it is a grave question whether there would be as many men available the second year by virtue of the physical burden which their activity in the survey work had generated for them.

Have we over-estimated the task or have we pictured it in its extreme? The writer does not think so. In fact, experience has proven that six minutes per child is barely sufficient for a tolerable compromise program.

In searching for a solution of this problem, it occurred to the writer that the dental problem, which from an educational point of view is less important than the one for which we are charged with the responsibility, was very satisfactorily met by the establishment of a somewhat subordinate group in what is known as the Dental Hygienist.

If this plan has proven satisfactory for the dental field, why should not a similar group prove equally or more satisfactory in the eyesight conservation field?

By this means there could be developed a corps of young women who would devote all of their time to the survey and supervising of school children's eyes, the supervisory work being equally advantageous to the selective process effected by the survey work. In this supervisory work could be included not only the following up of cases selected for determinative examinations, but the truing and adjusting of frames could be included, to say nothing of the possibility of developing a classroom method of treating suspenopsia and giving stereoscopic exercises. All of this would ordinarily be comparable to the prophylactic treatments given by the dental hygienists.

In addition to this, such a plan would also give excellent opportunity for the development of a consciousness of the importance of eyesight conservation, so that the child would carry it through not only its educational period but also that of adolescence.

A course of training for these young women covering a period of two years, with high school graduation as a pre-requisite, could easily be worked out in the extension departments of the universities now conducting optometry courses, which would adequately meet the requirements, just as they are met for the dental hygienists.

I grant you that this problem, being presented in this manner, as far as the writer knows, for the first time, cannot be immediately solved, and optometrists alone should not attempt to do so. The importance of its urgency, however, should be impressed upon all concerned, including board of education, all practitioners engaged in eyesight conservation work, and the university authorities under whose jurisdiction the training of these eyesight surveyists would come.

You will agree that this is a public welfare movement that deserves our attention as optometrists, and if the privilege is granted us ultimately to see it in operation we may take credit only, I hope in the priority of its suggestion. May the newness of this suggestion provoke discussion.

DR. ERNEST PETRY,
114 LINCOLN ALLIANCE BLDG.,
ROCHESTER, NEW YORK.

BIOMICROSCOPY OF THE LIVING EYE ITS OCULAR MANIFESTATIONS*

W. I. Brown, Opt. D., D. O. S., F. A. A. O.
New Bedford, Mass.

The subject that I am going to talk about this afternoon is one that has become of more importance to me as I have gone along with it. When it was first suggested to me that I take up this work I rather questioned the idea, because I did not see the necessity of an optometrist doing this work.

I can say there have been two occasions of great importance in my optometric life and two gentlemen whom I have a different feeling for than almost any individuals that I have come in contact with. These men awakened within me the real sense of duty that an optometrist should have towards humanity. One of those gentlemen happens to be present here today, Dr. Charles Sheard, who gave me my original awakening. Immediately after I had come out of school, I did as many others did, I laid back and thought that all I had to do was just to go ahead and practice optometry. Then Dr. Sheard brought out his book on "Dynamic Skiametry" and I read that book through one day and I thought to myself: "I don't understand that clearly," and I asked my dad, whom I was associated with, "Have you read this book of Dr. Sheards?"

"No," he said, "I haven't. Is it worth while reading?"

I said: "Why, I don't get much out of it."

"Then," he said, "I guess I ought to read it."

So he read it through and we had quite a little discussion about it and he said: "You better read it again." I did, and every time that I read that book through, I began to gather a little better idea of how little I did know. I began to find out that I had discovered somehing new and I was interested, and that was the initial push that started me on to doing the very best I possibly could in an optometric way for every patient. Dr. Sheard later on gave me very valuable personal instructions.

Some years after this incident that I just spoke of, a gentleman recommended to me the use of the slit lamp microscope. One evening we were seated in Rochester at a hotel enjoying a very pleasant dinner and Dr. Max Poser asked me some questions in embryology and histology. He finally said: "Do you understand what I am talking about?" I said: "No, sir, I do not."

"Well," he said, "I am glad to hear you say that you do not know when you don't." Then he started in to explain these conditions that we are about to consider and discuss this afternoon, and

*An abridgement of the material presented before the American Academy of Optometry at Chicago, Illinois, Dec. 3rd, 1928.

he showed me there was another phase of this profession that I knew little about, and that I ought to know about, and I then started in to study how to use the slit lamp with the microscope and also the technique of its practical application. To him I am indebted entirely for the still further advancement or push to higher planes, and to him I am also indebted for my technique. He has been in my home in New Bedford and spent several days at a time with me there and has built for me an optical laboratory, and I now have a fairly good optical equipment, that is, in the way of optical bench and photographic material and microscopes, and I am also fitted out to make spectral analysis.

I have come to believe that optometry has before it as great possibilities as any profession in existence today except those men doing pure neurological, biophysical or biochemical research work. Optometry, in my own mind, will always be more closely associated with neurological work.

Today we are living in an entirely different period than we have ever seen in our existence. Most individuals that we come in contact with are either hyper or hyposensitive individuals, and I can safely say that probably at least 75 per cent of us are toxic. The old methods that we were using years ago, even in our ordinary refraction, are no longer ideal. We have got to consider entirely new basic principles in making our final prescription, and safeguarding our patients' health.

Now let us turn back the pages to about 1905. During that year I had my introduction to a fundus picture and from that time on until the present I have viewed thousands of retinae with my various ophthalmoscopes and it was not until about 1920 that I began to hear that the media through which I had so often looked was not an optically empty medium. (Cataracts, corneal scar tissue and vitreous opacities to be excepted.)

If you will visualize some of those brilliantly clear fundus pictures that you have seen, I will wager that you never thought about the media through which you were looking; it might just as well have been a brilliantly clear piece of glass over that retina; and yet, how many layers of tissue were interposed between our own eye and the patient's retina and it is hardly probable in one case that all those layers were perfectly free from even congenital defects. How much we were missing, and yet we were not to blame that this should be the case. We were not equipped for this work, although about the time the war broke out they were doing this work in Germany, Holland and Switzerland. How can it be accomplished? We must have some means of illuminating the tissue in order that we may view it with a microscope. This was accomplished by the use of a slit lamp that had been invented in 1911 by the famous Alvar Gullstrand, and combining it with a binocular microscope in which erect images are obtained by the use of *Porro* prisms, (with

four reflections) and giving stereoscopic effect. Up to this time all our knowlege of eye tissue structure and cellular changes was obtained after enucleation or the death of the patient. This was not satisfactory histologically or for diagnosis or treatment. We must view the living tissue, know what its normal is, what its congenital defects are and how it varies with degeneration from any cause.

It is extremely interesting to find out how many of us are not fully developed when born and it is these congenital defects that sometimes interfere with our visual acuity and fields and of which we knew nothing until this new branch of ocular work was conceived, namely slit lamp microscopy or biomicroscopy of the living eye. By it each section of the eye is studied layer by layer.

I will not take time to explain the construction of the instrument. This can be obtained from the manufacturers, but will explain the use of the illuminating and viewing factors. (At this point Dr. Brown showed the focusing of beam, using astigmatic beam of Koby, some of the beams of varying widths. Beam can rotate to any meridian; also circular apertures of various diameters. Position of axis of projection of beam in relation to axis of microscope and manipulation of microscope.)

The methods of illumination are many but for our use four different ways will suffice: *Direct,* also called oblique or focal, *transillumination, mirror light and indirect.**

The direct method is the most used and the easiest. The beam is focused directly upon the lesion or area to be viewed.

In examining by transillumination a reflecting surface must be used as the iris or lens when examining cornea; lens for iris and posterior part of lens for the anterior. The use of the anterior capsule I have found more difficult although many claim to have no trouble with it.

Mirror light is useful in biomicroscopy but bothersome to beginners in ophthalmoscopy. Remember how we used to try to get away from it when we first tried to see the fovea, and now in this work it is of value. We obtain this type of light by having the patient look between the light and the microscope.

Indirect consists of focusing the light at the same depth but just at the side of the object to be viewed.

These various methods should be learned because in some cases one type will bring out details that will go unnoticed with other types of illumination. All this work is done in a darkened room.

Together with the above we use beams of different forms, the Astigmatic Beam of Koby. (Dr. F. Ed. Koby of Basle.) This is obtained by interposing a + 9 D. or + 10 D. plano cylinder with its axis horizontal at the end of the Koeppe tube. This increases the length of the beam, making it possible to view the whole diameter of the cornea and lens at one glance. It is not practical for use

*Note Insert.

SUPPLEMENT.
The American Journal of Optometry
March 1930. Vol. 7., No. 3.

ON THE USE OF THE SLIT-LAMP

OBJECT VIEWED	TYPE OF ILLUMINATION	POSITION OF BEAM	POSITION OF MICROSCOPE	DIRECTION OF PATIENT'S VISUAL AXIS	WHA
Conjunctiva.	Regular slit 1 mm. wide red free for vessels.	40°*	In front of light-image to small angle directed to reflective beam.	Directly ahead.	Changes in ve lar action, e
Cornea.	All types.	Small angle of incidence.	Nasal or temporalward of beam about 20 degrees.		Corneal nerve bedewing, w dull silver c on. (Arcus limbus.) Ha tuberances f chamber (lo Thinnings a to large flak tureless laye posterior sur
	Transillumination for bedewing.	Wide angle used mostly.	Directly in front of vertex cornea.		
	Mirror light for folds in Bowman's or Descemet's membrane.	Always wide angle.	Axis in direction of reflected rays.		
	Epithelial bedewing. Hexagonal cells of endothelium.	Varied so as to avoid corneal reflexes.	Directly in front of part being examined.	Ahead to sides and upwards and downwards.	Minute floati branes, bloo
	Very narrow beam for determining location.				By the movem the convecti The whole a cycle passing face and do endothelium.
Anterior chamber.	Direct narrow beam. Cylindrical beam.	Wide angle, 60°.			
Iris.	Direct, indirect transillumination.	30° to 40° 50° to 60° 80° to 90°	Directly in front of section under examination axis direction of reflected ray.	Ahead.	Anterior surfa border, synec brane. Sphi
					Depigmented a
Lens.	Oblique narrow beam for phantom cross section, wide beam to examine various surfaces.		Nasalward towards beam when incident ray comes from temporal side and temporalward when beam is changed to nasal side.	Slightly to temporal and nasal sides, depending on direction of incident beam.	Zones of reflec vasculosis le ities, clefts, filled, vacuol clear. (Wat Vessels upo iritis, iridocy termine whet (Shagreen post terior capsul red with thi oblique.) Shagreen (ant sclerosi.
	Transillumination.	Small angle.	Directly ahead to nasalward and directly ahead to temporalward.		
Vitreous and retrospace.	Phantom section beam sharply focused on posterior capsule.	Directed from both nasal and temporal sides. 20° to 30° angle.	Directly in front of posterior capsule area, illuminated and scope swung slightly laterally to get clearest definition.		Empty retro-l vitreous, pers upon structu framework. Koeppe claims is indicative disagree with

*Approximate.

[To accompany paper by W. I. Brown on "Biomicroscopy of the Living Eye."]

[T

ITION OF ROSCOPE	DIRECTION OF PATIENT'S VISUAL AXIS	WHAT TO LOOK FOR
of light-image ll angle direct- reflective beam.	Directly ahead.	Changes in vessels, pigmentation, corpuscular action, elevations.
temporalward n about 20 de-		Corneal nerves, epithelium and endothelium bedewing, vessels in cornea, precipitates dull silver colored or pigments Gerantoxon. (Arcus seniles—note separation from limbus.) Hassal-Henle bodies, wartlike protuberances from endothelium into anterior chamber (look like holes in endothelium). Thinnings and thickenings, fine dust-like to large flaky opacities, folds in the structureless layers. Deposits of pigment upon posterior surface.
in front of ver- nea.		
direction of re- rays.		
in front of part xamined.	Ahead to sides and upwards and downwards.	Minute floating particles, pseudo-membranes, blood corpuscles, and pigment. By the movement of the suspended particles the convection currents can be shown. The whole aqueous fluid is in motion, its cycle passing upward across the iris-lens face and downwards across the corneal endothelium. This is a thermal action.
in front of sec- nder examina- xis direction of d ray.	Ahead.	Anterior surface (Collarette) and pigment border, synechia, persistent pupillary membrane. Sphincter and neoplasms, nodules.
		Depigmented areas colobomas. New vessels.
rd towards when incident mes from tem- side and tem- ard when beam nged to nasal	Slightly to temporal and nasal sides, depending on direction of incident beam.	Zones of reflection, nuclei, remnants tunica vasculosis lentis, hyloid membrane, opacities, clefts, speicules determine if fluid filled, vacuoles whether smoke filled or clear. (Watch these for change in size.) Vessels upon anterior capsule (indicate iritis, iridocyclitis) opacities of sutures determine whether conjunctival or not.
ahead to nasal- and directly to temporal-		(Shagreen posterior capsule.) Deposits anterior capsule all kinds vessels. (Appear red with this illumination and gray with oblique.) Shagreen (anterior capsule) and sectional sclerosi.
in front of pos- capsule area, ated and scope slightly later- get clearest on.		Empty retro-lentil space. Framework of vitreous, persistent hyloid artery, deposits upon structure fluidity and sclerosis of framework. Koeppe claims that pigmentary degeneration is indicative of preglaucoma but others disagree with him.

[To face page 144]

with high magnification.

The Narrow Beam used by Vogt. (Prof. Dr. Alfred Vogt of Basle.) This is obtained by using a slit of 0.5 mm. wide. By its use we see an optical section of tissue. This method of illumination is best for seeing the zones of discontinuity or for localizing changes in the corneal or lens substance.

The Conical Beam. This is made possible by changing to a circular aperture; there are generally three of different diameters. The circular aperture gives us a conical beam giving the appearance in the tissue as though a hole had been bored through it or a rod-like area. This type of aperture probably gives the best results in estimating depth and is used in examination of the aqueous fluid. Dr. Harrison Butler method.

It is my custom to place the illuminating element in position, temporal to the patient, slide the microscope to a position approximately in front of the eye to be examined. Then adjust the height of chin and head rest to very nearly the place that I judge will be correct. Then I admonish the patient that once they are correctly positioned I do not want them to move their head or talk and that they are to pay strict attention to my directions. The patient is then directed to place the head in the rest and the adjustments made to enhance their comfort. Now the light is turned on with about a 1 mm. opening using the astigmatic beam of Koby, and the beam is brought to a focus, its position at the temporal canthus. And here we start to use the microscope with slit lamp illumination.

A study of the conjunctival tissue and vessels is then made, gradually working the beam towards the corneal margin and together with the microscope kept sharply focused by sliding the illuminating unit forward and back and turning the screw handle to move the microscope forwards and backwards. When the region of the limbus is reached the vessels and flow of blood should be very carefully observed, the vessels as to calibration and corpuscular action as to speed and type of motion; for here we are often able to determine very early in their progress, cardio, general vascular and toxic conditions. Here also are found vascular changes that indicate the presence of an inflammatory process of repair in action.

The vessels are very important indicators of condition and if we recall our anatomy we will find that there are three groups: the posterior and the anterior conjunctival vessels and the anterior ciliary in the subconjunctival tissue.

It is this last group that we must study carefully for when normal we see them only as large vessels (considering area) ending several millimeters from the corneal margin; but when we find the capillaries visible and forming a ring around the cornea, made up of fine straight lines, you can be sure that something is not as it should be. This condition need only be visible in small areas.

This brings us to the examination of the cornea.

Next with painstaking care move the light very slowly nasalward until the band is lighting the corneal tissue, now focus carefully upon the external surface both the beam and microscope and if proper adjustments have been made the following truncated prism, as shown in Figure 1, should be seen.

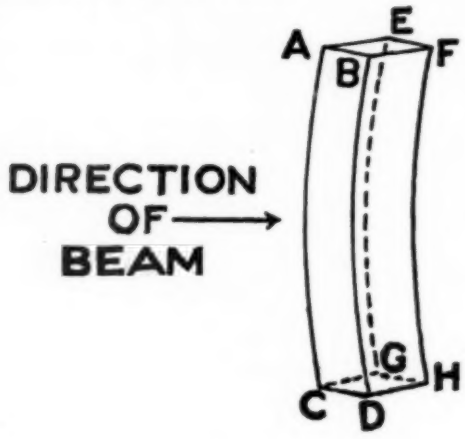


FIG. 1

Letters A. B. C, D, designate the front surface and letters E, F, G, H, designate the back surface; this gives a cross section of the cornea and by focusing a trifle deeper we bring the endothelium or posterior layer into view and this should be studied with the utmost care because here the first visible changes from normal take place in irido-cyclitis, some forms of keratitis and in secondary or subacute glaucoma. Thus we are able to examine the entire cornea and by a deeper adjustment scrutinize the iris, anterior capsule of the lens and aqueous humor. In cases where the aqueous humor has particles in suspension the movement caused by convection can be seen. Its flow is upwards in front of the iris and downwards back of the cornea, as shown in Figure 2.

FIG. 2

Then drop the beam below the eye, move it back to the temple side directly below the temporal sclero-corneal margin, and then raise it so that the lower edge of beam and the inferior limbus margin are the same height. I now make a general examination of the lens and vitreous focusing in and out and adjusting my light focus at the same time. Now I drop the beam below the eye again, narrow the slit width about ½ mm. and raise to a position in which the lower edge of the beam would be at the height of the lower limbus, and move the beam slowly to the pupil margin and focused to that depth the beam forming an angle of 30 to 40 degrees with the anterior posterior globe axis and the microscope approximately at right angles, 80 would perhaps be a little more exact to the beam on the opposite side of this imaginary line. The effect is that of a thin phantom optical section of the lens showing the various zones of discontinuity or reflection, these naturally varying with the age of the patient. From forty on we find five anterior and five posterior bands listed as follows in Figure 3: (1) anterior and (10) posterior bands of lens,

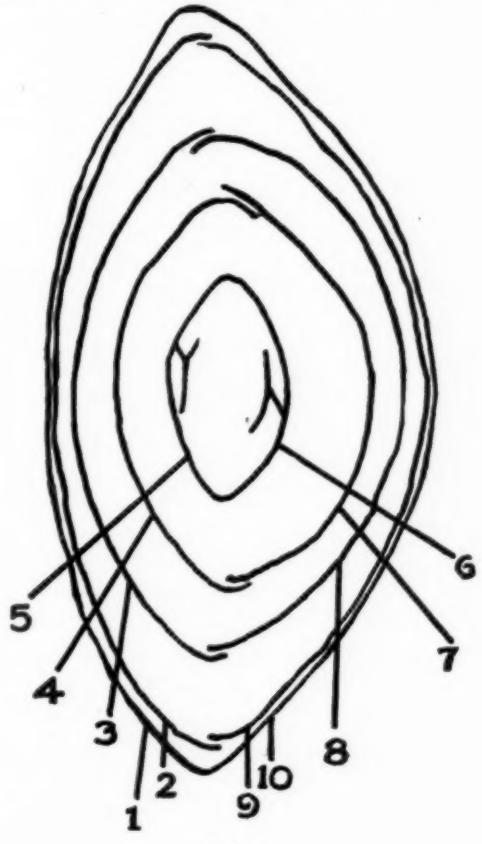


FIG. 3

(2) anterior and (9) posterior band of disjunction, (3) anterior and (8) posterior band of adult nucleus, (4) anterior and (7) posterior peripheral band of foetalnucleus, (5) anterior and (6) posterior central band of embryonic nucleus and the anterior and posterior Ys anterior erect posterior inverted. Now adjusting the slit to medium width and changing the angle of incidence of the beam to about 25 or 30 degrees and turning the microscope to a position pointing directly along the anterior posterior axis we now direct the patient to look into the microscope and proceed to examine the anterior third of the vitreous. This being our limitation without the use of a contact glass. Because of the narrow angle of incidence required it is advisable to examine with the beam on the nasal side also in order to see as much of an area as possible.

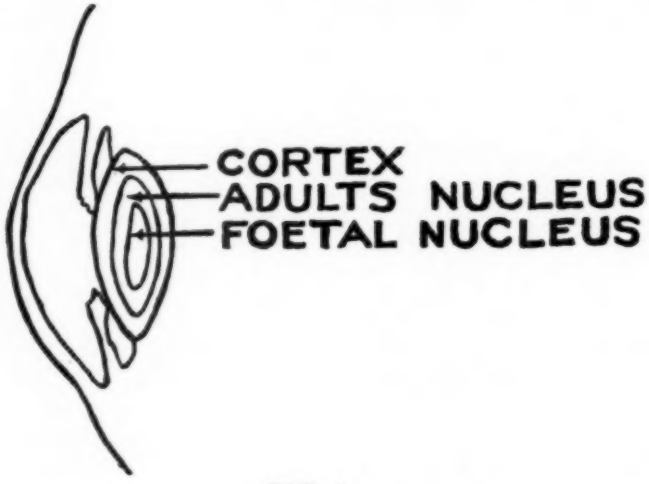


FIG. 4

Now, there is one other thing in the lens that I want to speak about. In the lens you often find one or more vacuoles and here we have a very fine means of diagnosing or watching the progress of many complicated cases, because if we find the vacuole, that I call "smoke-filled," and the nearest thing that I can give you to make you see the picture as you would see it with the slit lamp is that if you ever remember a man smoking and blowing bubbles for his kiddie and blowing the smoke inside of a smoke bubble, then you have the exact appearance of a smoke-filled vacuole. That is the nearest thing that I can think of as an illustration of it. Now, you will find those sometimes very small and sometimes I have seen them where they were the diameter of the pupil.

If, in watching the vacuoles you see them increasing, you know that the condition itself is not being properly taken care of and that the causes of the condition is becoming a greater menace to the health of that patient. If you see vacuoles of that type, held at the

same size, you can know that the condition has been checked and perhaps it has been cured and it may never change from that condition.

Then, we often find in this type of degeneration of cellular structure the vacuole diminishing in size, and sometimes entirely disappearing, leaving behind it just a very small punctate spot that you can see; sometimes the rings are left intact and sometimes the rings are broken through in places. You also find the lenses filled with a great many vacuoles that are perfectly clear, just as though you took a piece of clear jelly or gelatin and put a little glass ball in it. Now, in that type of vacuole it is non-pathologic; it is a condition that has probably been there since birth and those never change in size that I have seen. You will notice in looking through them, that back of them there is always a shadow cast, as you look through the cross section. Although that looks perfectly clear and looks as though it was made out of glass, the peculiar action of the light upon it is such as if of a different index.

Of particular interest are the findings of Vogt in glaucoma and diabetes. In glaucoma he often but not always found migration of pigments, partially adherent to iris and partially filling its crypts, some attached to lens surface, some in suspension in the aqueous and some attached to posterior surface of cornea.

In diabetes the pigment border appears to be of a spongy consistency, full of tiny pits, and breaking down of pigment mass. Cataracts of all types have been seen but one condition seems to be peculiar to this disease. It consists of a great number of small smoky colored opacities situated immediately beneath the epithelium, and often the surrounding areas have a milky appearance.

Koeppe claims that in the case of senile cataract that quiescence or rapid progression can be prognosticated by careful examination of the spicules. In those cases where the spicule fissures are filled with fluid or there is lamellar separation that the cataract will develop rapidly and that their absence shows slow progress.

Now let us consider the various sections to be examined, chart the incidence angle, position of microscope, direction of fixation and what we may observe.

Dr. Brown then gave a clinical demonstration showing the technique and projected slides to show conditions to be looked for and gave causes of changes.

DR. W. I. BROWN,
18 NO. 6TH ST.,
NEW BEDFORD, MASS.

A CRITICISM OF THE "NEWER" OPTOMETRY*

Dr. Earl J. Deane,
Bloomsburg, Pennsylvania

The December, 1929, issue of "The Pupil"—the official college newspaper of the Pennsylvania State College of Optometry—publishes an article on Metabolism and Urinalysis by Dr. Wilson H. Hankins, a member of the college faculty and professor of biochemistry.

From this article we infer that urinalysis and dietary control of metabolism are a part of the college curriculum, or, if not, that the professor is teaching and advocating the use of such measures by the optometrist as an extra-curricular activity.

We wish to direct attention to the fact that urinalysis is twofold—Laboratory Urinalysis and Clinical Urinalysis and, as practiced in the laboratory and in the clinic, urinalysis is an art—a *medical* art.

This raises several questions. Does such teaching have a proper place in the optometric curriculum? Is the optometrist sufficiently well trained and competent to recognize the diagnostic significance of the various findings of urinalysis? Can the optometrist make a competent clinical urinalysis—without which the urologist is hopelessly at sea? Does he know that such findings should always be confirmed by laboratory analysis and by physical examination of the patient—that these propositions are fundamental? Is he competent, and, as an optometrist, licensed to do these things? Of what value is it to him? *As soon as he uses it he trespasses in medical fields.*

For years we heard the cry, "A lens is not a pill!" and laws regulating the practice of optometry were obtained on the argument and fact that optometry is not, never was, and made no pretense to being, a branch or part of the practice of medicine. If this be true, why train, or urge, optometrists to trespass in the field of medicine? Medical opposition to optometric acts was based on the plea that optometry sought to enter medical practice "by way of the back door." In advocating urinalysis as an optometric diagnostic procedure is not the author of the previously mentioned paper opening the back door of the medico's house?

Assuming that a dropsical patient with a cardiac cachexia has his eyes examined by an optometrist, because of headaches and vertigo, and it is found that glasses are not needed. We infer that the professor would have the optometrist proceed with a urinalysis and, on the interpretation of his findings, prescribe or outline a dietary regimen for the patient! Not knowing that in such a condition

*Submitted for publication Jan. 5th, 1930.

all the tissues are so affected by malnutrition that normal osmotic processes are in abeyance, and the extreme difficulty of regulating the quantity of fluids to be given by the quantity of urine secreted, the optometrist who attempts diagnosis on the basis of a urinalysis, followed up by dietary instructions, is obviously on dangerous ground. We are bold enough to suggest that the professor's efforts in bio-chemistry, as applied to optometry, would bear more fruit if directed toward researches concerning the etiology of cataract and glaucoma.

Having finished with these observations directed toward Philadelphia and Dr. Hankins—we now do an about face toward Minneapolis and Dr. J. I. Kurtz, the author of a series of articles on "Ocular Electrotherapy," published in the American Journal of Optometry.

While it is true that electrotherapy is one of the many forms of physiotherapy that does not include the use of drugs, we believe that, in the hands of the optometrist, it is a very dangerous proposition for both patient and practitioner.

Although great advances have been made in electrotherapy a uniform technic of application has not as yet been adopted. While electricity is an efficient helpmate *in the practice of medicine,* the results of value from any mode of application are in direct proportion to the skill of the operator. An authority on electro-therapeutics has said, "In order to be a successful electrotherapist you must have all the knowledge possessed by the medical man, and, in addition thereto, the knowledge of what electricity will do and be able to apply it accurately." Does the optometrist have this knowledge? Assuming that he does, he cannot use it without trespassing in a field that is distinctly medical. In event of a serious accident, such as a fatal hemorrhage or the "going out" of a case of cardio-renal disease, who will sign the death certificate for him?

Those whom I have criticized, and the supporters of the "newer optometry," will no doubt visualize me as a fatuous old being, wholly uninformed as to modern optometric progress, and hiding behind bosky whiskers and a pair of horn-rimmed spectacles that lend an air of intellectuality not borne out by closer acquaintance.

What has been said will no doubt raise the question as to our competency to pass judgment on their ideas and actions. While we may not be cajoled into admitting that we are a good optometrist—*Sursum Corda!*—we are ever ready to admit that we have, and do, make mistakes. A few days ago we again read an article we wrote some fifteen years ago, supporting the proposition that the taking of blood pressures should be a part of optometric work. Today we look upon that article as one of the greatest literary mistakes of which we have been guilty in almost fifty years of life.

As to our ability to pass judgment, we depart from good taste and talk about ourself long enough to submit the following: After some years of medical practice, we took an intensive twelve months

course in pathology, bacteriology and laboratory technique before we were placed in charge of the laboratory in a large government hospital, where we served for two years as laboratory chief.

A little over a year ago we were considering a position as pathologist and laboratory chief in a local hospital and, feeling that our training was somewhat inadequate and our technique rusty, we arranged for, and completed, an intensive nine months course in the laboratory of one of the largest and best equipped hospitals in the state.

If at this time, after such training and experience, the problems of diagnosis from the findings of urinalysis not infrequently give us much concern, where does the average optometrist who attempts urinalysis "get off at"?

When it comes to electrotherapy we pretend to no knowledge of the theory or technique. For us to attempt an appraisal of its values would therefore be absurd.

The obvious fact that the work of all the professions dealing with human infirmities at times overlaps, is not, we believe, a legitimate excuse for an optometric invasion of medical fields. We, as optometrists, have a legitimate, extensive and fertile field, a large part of which is as yet unexplored. Time lost in chasing semi-medical rainbows might better be spent, we believe, in real optometric research, or in improving our present methods. In sixteen years of exclusive optometric practice we have yet to see a paper, or hear a lecture, on how to make a better trial case refraction.

Optometry is an ancient and an honorable calling that has, strictly on its merits, proven its competency and right to a place among the learned professions. It needs no medical sidelines to enhance its prestige.

In conclusion we wish to say that these criticisms are in no way prompted by personal animus. We have set them forth because we honestly believe that the practices criticized form no part of, and have no place in optometric practice—that the practitioner who employs any of them is indeed treading on very dangerous ground.

DR. EARL J. DEANE,
300 CHESTNUT AVENUE,
BLOOMSBURG, PENNSYLVANIA.

CHROMAGRAPHOLOGY

W. Jerome Heather, Opt. D.
Philadelphia, Pa.

Chapter II.

Historical Survey

This—the second chapter of *Chromagraphology*—is to be devoted to the very interesting work of retrospection.

Because of the fact that *Chromagraphology* is a study of the visual interpretation of chroma (colour), we are directed mainly in our considerations to the peripheral field of vision, including therein the paracentral—in fact, everything beyond the fovea centralis where all colours are normally recognized. This, then, necessitates us delving far enough back to discover when the peripheral field of vision was first considered. It has not been possible to obtain any one simply worded and well organized work that fittingly covers the history of matters pertaining to the peripheral field so that one may make a study of the evolution of knowledge relating thereto. That is to say, we find no well correlated or well arranged discussion on the subject. It is true—there are more or less disconnected and unrelated references to these matters found here and there. Our effort, then, will be to present in articulate form the history of the subject of the preipheral field in order that we may gain better perspective.

In early civilization we find groups of people located along the Nile River, between the Tigres and the Euphrates, who, although they had attained conspicuous eminence in many matters pertaining to science and the arts, had not established any worthwhile conceptions regarding the peripheral field of vision.

It is interesting, however, to note that in the second century of the Christian Era, Galeon produced a surprisingly clear conception of the peripheral field of vision in his treatise entitled "Anatomy and Physiology of the Eye." If it were possible for you to search through this extraordinary work, you would find in Chapter Twelve, the following exposition which is certainly most remarkable when we consider the period in which it was written:

> "Suppose that one of the two eyes is gazing at a circle. From the middle part of the circle, which is called the "center," let there be conceived a straight line running as far as to the pupil which is looking at it. This should be, I say, not an angular line or a bent one, but one like a thin hair or spider's thread, passing from the pupil to the center of the circle; therefore, absolutely rectilinear.
>
> "Further, let us suppose that there are, in addition, a multitude of lines which pass from the pupil to the line which bounds the circle (which is also called the 'periphery'). These also

perfectly straight, like thin gossamer threads, each tight in its turn. Then we will call the finger which is bounded by these lines which runs straight to the circle, a 'cone,' the pupil being the apex of the cone, the circle its base. The line running straight from the pupil to the middle of the center we will call the 'axis.' Further, we will imagine a millet grain or very small body to be placed upon the axis, which extends through the air from the pupil to the circle's center. Then the center of the circle will be, as it were, covered, and the pupil prevented from seeing it. As soon, however, as it is taken away, either entirely or merely moved to one side, then the circle will be visible again.

"When one understands that, he will also easily comprehend that every object, in order to be visible, must be free from all obscuration—that is, nothing must lie on the straight line which may be conceived as running from it to the eye."

At first glance, we of supposedly advanced times would be very likely to call the above "a primitive statement," and yet it is a clear expression of the functional activity of the retina in both central and peripheral vision projected in the visual field. It is not only a pleasure to have this reference, but because it is the earliest that we have been able to uncover in a considerable search, it may be considered quite remarkable.

Then, as will be developed in a later chapter, science and art went into a state of dormancy which impeded progress until the middle of the seventeenth century. Of course, it is possible and perhaps not improbable that some references were made to the subject during this time, but they were surely not of sufficient strength and value to be of any consequence. In fact, we find that it was not until the early part of the seventeenth century that the king of England called before him in London a learned man of France. This man, a French priest, was also a very prominent physicist of his day. His name was Mariotte, and during his work he had discovered that the eye possessed a blind area due to the lack of visual function at the optic papilla.

Then followed another period, quite lengthy, in which very little was done in this line of investigation until in 1800 the Royal Society heard Thomas Young read his famous paper on "The Mechanism of the Eye." In this paper, Young demonstrated a very thorough conception of the subject-matter at hand—in fact, laid down fundamentals which have been full fledged considerations in the field of perimetric study ever since. It might be interesting to know in passing that Young, although a failure as a practicing physician, had personal means sufficient to allow him to extend his efforts in the field of science to the extent that his name became immortal. He did not confine himself to one subject, but was of such mental capacity as to divide his efforts over many subjects, including the deciphering of Egyptian hieroglyphics.

Before considering the measures instituted to chart possible failures in the peripheral field of vision, which will involve a con-

sideration of instrumentation, let us consider the peripheral field of vision and its importance in our every day life. It might be well to understand that in considering the peripheral field of vision as contrasted to the central field of vision, we will consider the central vision as confined to the fovea centralis, and the peripheral field or the seat of indirect vision, as extending from the fovea centralis in all directions to the orra seratta. We will consider its importance to optometry and ophthalmology from three standpoints—first, its importance as a visual fact—or; second, as a protective agency; third, its diagnostic value.

A very simple experiment, demonstrating even to the laity the fact that our indirect vision is highly important, may be made if the observer will occlude one eye (for instance his left eye) by covering it lightly. Now fix upon some small object in a room at fifteen or twenty feet distance, such as a push-button plate, with his right eye, and then by extending his right arm with his finger raised, out and in, up and down, he will reach a point where he has blocked off the view of the push-button plate by interfering with his direct field of vision. It will be apparent that he retains view of everything else about him which he saw before within the indirect field of vision. The inference is that vision is the factor which keeps us in touch with the world about us, and we would lose a far greater portion by the loss of the indirect field than we would through loss of the direct.

A rather homely example will sometimes clearly set forth a thought, and in that connection consider that when you are driving an automobile down the road that it is your fovea centralis which is fixed upon the road directly in front of you in order that you may avoid possible bumps or holes, but it is the indirect vision residing in the peripheral field which advises you of an impendng crash from the side, by virtue of the fact that that peripheral field is so highly sensitive to motion. A driver of an automobile would do well to consider development of their indirect field of vision for the reason that it would make them less susceptible to accidents, it being clear that a moving object anywhere within about a 180 degree arc would usually be visible to the normal pair of eyes. Animals have by reflex a knowledge of this point to the extent that they have learned to protect themselves by standing "stock still" in which case a hunter would perhaps not see them for the reason that he is attracted mostly by motion. Soldiers in the advanced sector during the recent war were taught that if they suspected someone being behind a tree or bush, probably in camouflage, to look just a little to the side of the supposed concealment for in this manner the image would fall in the peripheral field which is so sensitive to motion that the slightest movement would attract attention.

We have depended to a large degree in our ocular work upon the opthalmoscope for evidences of pathology which by virtue of such being quite well advanced made inroads on the retina and were, therefore, visible to the observers by use of this instrument.

The lesson for those vitally concerned in the interests of the patients who present themselves for correction and aid, is the necessity for recognition of changes in their incipiency, for when pathologic changes have taken place of sufficient degree to be recognizable with the ophthalmoscope, the corrective efforts of the ophthalmologist are of necessity handicapped, and the results obtained thereby are reduced. We now see that field studies are indicated in order to facilitate earlier recognition, and not merely as confirmatory evidence as they have been considered in the past.

In the latter quarter of the seventeenth century, Willis had referred to visual field defects as pathologic changes within the eye, but this consideration did not come into usage until about 1856 when Von Graefe indicated the importance of a study of visual fields in diagonsis of eye disease as well as in general disease. In order to make this analysis, Von Graefe devised a screen which, as is indicated by photographs in most text books, was quite large and troublesome from the standpoint of establishing a technique which could remain scientifically accurate with simplicity. Despite these facts, considerable success must have met the efforts of these scientists, and down through time there is a reversion to screen tests. The implication was that disease in the eye or posterior to it affected part of the perspective or transmitting apparatus of vision and were possible of discovery and slated on flat surfaces such as screens and blackboards.

In fact, Bjerrum, famous for the so-called "Bjerrum sign," a name given to a peculiarly shaped scotoma located mainly in the amaurotic triangle between the fovea centralis and the blind spot of Mariotte, made the statement in 1897 that he could obtain more information by using the back of his consulting room door than he could from the ordinary perimeter.

In 1869, Forrester produced the first arc perimeter. Its radius was twelve inches. On the arc of this perimeter points were marked for the appearance and disappearance of a piece of white paper one-fourth inch square attached to a piece of black foil. Forrester disclosed an extensive knowledge of the subject, and presented a chart for recording results obtained upon which he was able to show the configuration of the visual field and the position of the blind spot. His perimeter was fundamentally the perimeter of today. Little or no change has taken place in the principles, although some mechanical refinements have been made.

It will hardly be necessary to describe the innumerable perimeters which followed Forrester's development. The fundamental principle was a curved surface which presumably corresponded to the retinal curvature allowing a study of the projected field. Throughout the period of development, there has been a gradual simplification of working methods and handling of the test objects as well as many, more or less successful attempts of recording findings. These two last statements which are evidence of at least an attempt to simplify and speed up field charting are nevertheless a very good and sufficient reason for a careful checking of any type of

perimetric instrumentation before it is accepted for the reason that many variable factors enter therein. It is surprising to find that many perimeters do not possess a uniform radii of curvature probably caused by the warping of the material used.

Throughout this work, a great many difficulties present themselves which, if one carefully analyzes, may be laid at the door of proper fixation. It is no exaggeration to say that no perimeter is so constructed that there is an assurance of correct fixation regardless of the amount of care exercised by the examiner. Some writers have offered as an exception to this the perimeter devised by Dr. C. E. Ferree and Dr. Gertrude Rand of Bryn Mawr College who have presented an instrument which is practically perfect from a mechanical standpoint, and is most certainly accurate from a scientific viewpoint. Doctors Ferree and Rand were formerly located in the Bryn Mawr College in Pennsylvania where their work was to study lighting, presumably from the standpoint of physics or psychology, and probably both. Their very able work, particularly advantageous to the industries in its consideration of fatigue factors, was recognized by the scientific world. They were then commissioned, at the request of the American Ophthalmological Society to carry on their work at the new Wilmer Ophthalmological Institute connected with The Johns Hopkins Hospital in Baltimore, Maryland, directing their study to the diagnostic value of colour charting in non-pathologic cases. In passing, it should be said that they have in their handsome laboratory every type of illumination ever used, with every type of reflector against all possible backgrounds so that the observer can compare their efficiency for reading as well as the effect on the colour of objects. Anyone knowing (and the writer is happy to know) the careful, searching, responsible attitude which they take at all times will realize that their instruments must be as nearly scientifically correct as it is possible to devise. However, as shall be developed in a later chapter, the one essential necessary to avoid trouble in this work has not been corrected and makes it necessary to say that the same difficulty exists from the standpoint of fixation.

One of the next very important considerations which have been a factor in the development of perimetry is the subject of illumination. This, of course, is due to the fact that all stimuli used prior to the Tangemetric Campigraph were of the reflected type, being dependent upon the outside illumination in order to produce the stimulation, so that this condition was ever present. A person being charted on a clear day would show a variation from one charted on a cloudy day. This same variation would be found comparing the morning hours with the late afternoon hours of the same day. Of course, with a carefully developed laboratory, this condition could at least be partly overcome by compensating for the daylight illumination variations, with an artificial daylight. In this connection, I might say that it was a great pleasure on a recent occasion to visit Doctors Ferree and Rand in Baltimore where they have a laboratory built without regard to expense, so constructed by a double skylight roof that it is perfectly possible for them to close off the outside

roof by a series of close fitted curtains operated mechanically, and then to produce artificial daylight by lamps arranged between these two roofs in such a manner that it is possible to bring up the illumination from that which would be present at dawn to a high noon illumination. This is so carefully arranged that it is practically impossible for an observer to determine whether the light in the laboratory is artificial or natural daylight. It will readily be seen that this allows very accurate work, but is hardly available for the individual practitioner in his own office.

It would be wrong to pass by perimetry without mentioning the hand perimeter which, by virtue of the fact that it increases the demand on the personal qualifications of the examiner, is often a test of negligible value. Because of the fact that every text book on visual fields has a thorough detailed description of the methods of charting fields by way of the hand perimeter, I shall avoid useless repetition.

In dealing with the methods of field testing, we next consider the flat screen on tangent chart. Bjerrum, whose methods were followed by Roenne, gave a very strengthening background to that type of qualitative study. Von Graefe who, as we have seen, is responsible for the flat screen, was followed by D. E. Wecker in Paris who improved the technique of the arc by marking off the blackboard in concentric circles beginning with 10 degrees and running out to the limit.

At that time, however, they did not regard the value of a tangent scale and used the rectilinear method. This brought about a statement which, to this day, is often used by those not sufficiently informed in field work. Because of the rectilinear method, it was considered that only the first 40 degrees were accurate, but the 50 degree circle was only of approximate accuracy. This has been overcome, however, by substituting for the rectilinear method the trigonometric function of the tangent. There is still a consideration due as to the angles subtended, but as a later chapter will develop, this has little significance if any.

Great claims have been advanced for the various types of campimeters but it must be remembered at all times that no campimeter can be used in studying the extreme periphery, as is possible with the perimeter by virtue of its arc. In passing, I wish to state that because we have found that a certain area in the shape of a triangle, formed at the base by the blind spot of Mariotte and at the apex by the fovea centralis is usually the location of the most indicative of the scotomata, which will be explained later and classified as the amaurotic triangle, and further that it has been well proven, failures in chroma intepretation precede failures in the interpretation of a white stimulus, so that a tangent screen which is of sufficient size to allow a charting of the outside normals for colour will be, because of its simplicity, far more useful to the average practitioner than the perimeter.

Although this is not a place in which I wish to describe the basic principles necessary in charting fields, I must register the fact,

in connection with the above statement in pointing out the desirability of a tangent screen, that colour interpretation is seriously affected by the background against which the stimulus is displayed. It can be very easily demonstrated that either a black or white background will altar the color recognition and for that reason the background should always be of a grey which I see fit to term a "daylight grey." Further, as to the size of such a chart, the temporal field will have to extend to approximately 55 degrees in order to allow the study of the blue field, will have to extend at least 45 degrees to allow a study of the red field, and at least 30 degrees for the green field. Thus, anything which is short of 55 degrees will only allow a partial study of chroma interpretation which, as can be readily realized, will be of no value because incomplete. On the nasal field, it will be necessary to consider colour monocularly because of the fact that it will be necessary to go out as far as 40 degrees to study the blue field, 30 degrees to study the red field, 25 degrees to study the green field. However, when a binocular test is made, this is not possible. Claims have been made that binocular tests are right because with the monocular tests, it is hard for the patient to maintain his fixation with one eye occluded. This is, however, still only a makeshift procedure because of the fact stated above—that the maintenance of correct fixation is the hardest problem and must be solved, but not by sacrificing through the use of the instrument which eliminates the nasal field so important in early glaucomatous indications. That troublesome feature of fixation has now been solved, and is maintained with absolute ease. Suffice it to say here that the author has had the pleasure of having the psychology departments of our leading universities recognize that for the first time in the history of science the factors which have made proper fixation hard have been eliminated. The details of this devolpment will form the subject-matter of later chapters, and may be disposed of at this time.

It must be borne in mind that the instrumentation which has been described was designed primarily for the visual study of white stimuli. Demands for a still earlier, more delicate test led to the study of the visual interpretation of colour, and some very poor adaptations to the existing instrumentation were attempted. Scientifically, it must be remembered that the addition of coloured wands or stimuli bearers, as a form of accessory, does not make it possible to chart colour fields if the instrumentation itself does not meet the requirements necessary for a thorough study of colour and application of certain basic principles.

Therefore, in the study of *Chromagraphology*, we turn our attention to the peripheral field in order to ascertain and chart its interpretative limits. Our first consideration, in this peripheral field, is the establishment of normal limits for colour interpretation, and various authorities have found as many varied limits. In fact, at the present time, the work of Doctors Ferree and Rand is confined to the establishment of norms, and at the time of the writer's recent visit, they

had made studies using as a basis a certain number of hyperopes, myopes, astigmats, and emmetropes.

Occasionally someone, probably in good faith, brings up the question of difference in colours, oftentimes as to the degree of saturation or non-saturation which are decidedly inadequate terms, and although such efforts are generally backed by good intentions, the result is simply to confuse the issue and we feel that we can best help by eliminating confusing points, replacing them with the establishment of confidence. As will be developed in a later chapter, there are many possible, and certainly many probable sets of colours which could be used consistently for certain normals of their own. Therefore, passing over that issue, and for the purpose of stating the limits which will be used in this treatise, we will state that they are limits considered as normals, or a mean of the normals as found by a great number of authorities. For blue we will consider the temporal field as extending 54 degrees, superior 26 degrees, nasal 35 degrees, inferior 38 degrees; for red the temporal field 41 degrees, superior 21 degrees, nasal 27 degrees, inferior 28 degrees; for green temporal field 26 degrees, superior 18 degrees, nasal 23 degrees, inferior 22 degrees.

Although we are turning our attention to the study of the interpretation of colour by way of *Chromagraphology* and we have previously pointed out that such authorities as Traquair, Lloyd, Peter, and others have confined their attention mostly to the visual field; i. e., the visual interpretation of a white stimulus and further that they paid little attention to colour, it would however, be well to notice that Traquair says on page 72: "In any partial impairment of function, colour vision is first diminished and vision for white is demonstrably reduced only when the impairment has reached a certain degree." Lloyd on page 40 says that "Bjerrum sign is a large finger-like process from the blind spot, top or bottom, or from both places; reaching in the form of an arc toward and often involving the fixing area. This is a late sign of glaucoma simplex, is a color defect at first, does not often retreat if once established, and if it becomes a defect for white there is little hope for improvement. The perimeter is of no use in hunting for the Bjerrum sign, but some form of campimeter with small test objects, *good fixation,* and standard illumination is necessary." On page 41, he says again that the "Roenne's nasal step is an extremely late sign of glaucoma simplex, and can be found with a perimeter, but should be found much sooner than it usually is. If graduated white test objects are used, it will be found many months before it becomes a defect discoverable with the 5 millimeter test objects used, usually employed in perimeter." In answering the last statement, the writer received a letter from Dr. Hazel A. Wentworth, a former student of Dr. C. E. Ferree, and now at the Department of Ophthalmology at the Hospital of the University of Pennsylvania in Philadelphia, dated January 16, 1930, in which she stated as follows: "Yes, I have had several cases in

which the Roenne step has been obtained in the red field and not for form." (She is speaking of a white stimulus.) Further, in the same letter, she states: "I am enclosing a copy of the fields in one case in which it appears (she is speaking of the Roenne step in red) at the onset of glaucoma in the left eye."

In 1896, the well-known ophthalmologist, George E. de Schweinitz, wrote a book entitled "The Toxic Amblyopias," which has since gone out of print, but is a book to be treasured. The burden of this treatise was a discussion of the loss of red and green interpretation in the paracentral areas, and many references are made thereto. For instance, on page 29, speaking of amblyopia from alcohol, he says: "In the earlier stages a relative scotoma for red and green is present in the field of vision. Sometimes complete or partial peripheral defects for the same colors are present." It certainly must be clear to any rational thinker that these just rambling references to the importance of considering the visual interpretation for color, which is what we do in chromagraphology, indicate that color is the most important test because of its early diagnostic value.

Because it is both interesting and confidence-building, the writer wishes to publish a statement made on the same day of this writing, February 12, 1930, by one of the nation's best known brain surgeons, Dr. E. R. Carpenter, when discussing the Tangemetric Campigraph as related to its temporal limit of 60 degrees, its superior limit of 30 degrees, its nasal limit of 40 degrees, and its inferior limit of 42 degrees—"This field covered is by far the most important both to the ophthalmologist and the surgeon for the reason that most of our noticeable and indicative findings are located therein. In fact, it is possible to check the remaining by moving the fingers without instrumentation."

Summarizing—if we are now to see the importance in our work of chromagraphology, it behooves us then to put behind us those thoughts and methods which may not only be unsatisfactory but which were developed for another purpose entirely, and confine our attention to the main issue of this subject-matter. Therefore, the next chapter will take us immediately into a study of the evolution of the visual apparatus.

A FEW NOTES ON TOXIC EXOPHTHALMIC GOITRE AND ITS OCULAR MANIFESTATIONS*

Charles I. Saks, Opt. D.
New York, N. Y.

At the start, it may be advisable to state that the writer of this article went through a very severe case of toxic exophthalmic goitre and therefore can write of his experiences with some authority. The thyroid gland, situated behind the trachea, is one of the glands that make up the endocrine system. The complete function of the thyroid is not yet fully understood. Statistics tell us that there are five times as many women as men afflicted with goitre and that children as young as five years of age also have goitres. Symptoms of goitre range from very mild disorders to the most severe and alarming symptoms. The severity of the hyperthyroidism is not proportional to the amount of thyroid hyperplasia. By that is meant that a large goitre is not necessarily troublesome nor that a small goitre causes no trouble. The usual symptoms of goitre are anorexia, tachycardia, loss of weight, diarrhea, insomnia, extreme nervousness, incessant hiccups, exophthalmos. There are some cases of hyperthyroidism in which there is an over desire to eat. In the more severe types, the skin is flushed and moist (hyperhydrosis) and high blood pressure is sometimes present. The loss of weight is accounted for by the increased metabolic rate set up by the hypersecretion of the thyroid. Nourishment cannot be supplied fast enough; the output is greater than the intake, hence, the loss in weight. This is why thyroid extract causes a loss in weight by those who wish to reduce. The diagnosis of goitre is obtained by taking a metabolism test, van Graefe's sign and other symptoms mentioned above.

A metabolism test is one in which the patient is made to inhale pure oxygen over a given period of time. The volume that he consumes in this time tells if hyperthyroidism is present and to what extent. The readings are given in numerals that were calculated by physicists so that the results can be easily interpreted. For instance, from zero to plus 10 is a normal condition, plus 30 or above shows the presence of hyperthyroidism. Minus readings show the presence of hypothyroidism.

The known causes of goitre are lack of iodine, worry, local or general infection. The average case shows no fundus changes. The exophthalmos is, I believe, not due to the contraction of Mueller's orbital muscle. This muscle is merely a vestige of the time when our predecessors had to expose their eyes so that they could look carefully around them. This exophthalmos is due to a sympathetic dilation of the orbicularis. It must be remembered that in hyperthyroidism there is a general hypotonicity. There really is not much bulg-

*Submitted for publication Aug. 10, 1929.

ing of the eyeball. It is simply apparent because of the increase of the palpebral aperature. The average amount of actual bulging is between one and two millimeters. This, I believe, is due to the fact that the eyeball falls forward because of the relaxation of the orbicularis and the external ocular muscles.

When the writer was examined at the Cleveland Clinic previous to the thyroidectomies (three in all) the oculist Dr. Ruedemann, in charge of the eye department, said that the average reading with the exophthalmometer is between 14 to 17 mm. Anything beyond this shows true exophthalmos. He made this statement after observing two thousand cases. He also stated that practically every thyroid case showed an exophoria which increased after the operation. If there was an esophoria, it decreased after the thyroidectomy. About three months previous to the operation, the writer suffered quite some ocular discomfort. There was always a tired feeling in and around my eyes. This continued until well after the last operation. The pupils were about 1½ mm larger than normal. The writer's eyes also showed an increased intraocular tension previous to the operation.

DR. C. I. SAKS,
104 WEST 76th STREET,
NEW YORK CITY

THE TATE DYNAMIC SYSTEM OF SKIAMETRY: A CRITICISM*

Philip Pollack, O. D.
Brooklyn, N. Y.

Tate Dynamic System of Skiametry as expounded by Dr. Whitaker† in the issue of September, 1929, is certainly the most ambitious attempt that has so far been made to devise a system that will automatically interpret the dynamic findings for every possible refractive disorder or combination of refractive disorders. In taking exception to its conclusions, the writer wishes to pay tribute to the high degree of ingenuity that it reveals, an ingenuity and thoughtfulness that make the article an outstanding one in recent optometric literature.

An analysis of the theory will show, in my opinion, that the whole edifice rests on three assumptions. If these foundation-stones are insecure, then the structure that they support falls. It is the purpose of this short paper to suggest that they are not secure.

These three assumptions are as follows:

(1) That the amount of convergence-accommodation at 13 inches in the case of a pair of young, emmetropic eyes with orthophoria for distance and 4 to 6 of physiological exophoria for near, is *always* 1.50 D., so it can serve as a constant.

(2) That there is a proportionate, mathematical relationship between convergence and accommodation.

(3) That the convergence-accommodation "includes the cramp" in a case of accommodative spasm.

Now, regarding the first assumption that the convergence-accommodation under the conditions given is 1.50 D. is indicated clinically by Dr. Whitaker as follows:

"Have this same patient fix attentively on a vertical line of fine type at 13 inches and add plus lenses equally in O. U. until the print starts to blur. We will find this value to be 1.50 D. of plus power before the eyes. Now add base-in prisms before O. U. a little at a time and we will find we are able to add more plus power before the eyes until the print starts to blur again. When we have 9 base-in over each eye or a total of 18 base-in for O. U., we will be able to place before the eyes plus 3.00 D. instead of plus 1.50 D., as was found without the application of the prism base-in."

Now the first thing to note about this experiment is that it involves duction and fusion power, as the prism power is increased. When 18Δ base-in prism is before the eyes, the patient will either see two lines of type and mentally suppress one of them or else he will

*Submitted for publication November 30, 1929.

†["These particular remarks do not, of course, refer to Dr. Tate's recent scholarly article, which is indeed a model of the kind of scientific work urged upon optometrists and which appeared in the Journal after the author's paper was submitted."—P. Pollack.]

succeed in fusing them or finally there might result a struggle for mastery between the two visual fields with first one and then the other predominating. In the latter case there might be a blurred effect due to imperfect fusion.

These facts make it difficult to arrive at exact, dependable results by this method.

In regard to the first part of the experiment, before the prism power is introduced: "Investigations show," writes Dr. Sheard, "that the amount of plus quantity through which various youthful emmetropes—as determined through various static tests—of about the same age, can read without discomfort or blurring varies considerably." This tallies with the results obtained by the writer who discovered in his clinical investigations that the emmetrope referred to by Dr. Whitaker does not necessarily see the print blur when 1.50 D. of plus power is placed before both eyes, as the following sample experiment indicates:

Patient: Miss S. R. C. Age 27. Physiological exophoria of 3 (13″). Orthophoria at distance. Emmetropia, without any need for glasses. Enjoys perfect and comfortable vision with both eyes and each eye separately. I added plus lenses equally until the print at 13″ started to blur. This occurred only when I had O. U. plus 2.75 D. before the eyes. I added prism power base-in until I had 9 base-in before each eye, but any added plus caused the type to blur. With 18 before both eyes, she succeeded in fusing the images but extra plus began to blur.

This test would seem to corroborate the statement of Dr. Sheard and others that the accommodation and convergence show independence as well as interdependence. It is interesting to note that it required O. U. plus 1.25 D. and no more to cause a reversal of the shadow by dynamic skiametry at 13″. This would seem to suggest that some factor (perhaps the effect of light), *other than convergence-accommodation,* causes a play of accommodation that will not surrender to plus lenses—a factor that is not present when she reads type at 13″.

Regarding the second assumption the results of such an experiment applied to many individuals of the required condition, plus the empirical knowledge gained by the busy refractionist in his work, seem to indicate that it is rash to attempt to construct a working reference table as Dr. Whitaker did, based on a rigid, mathematical relationship between convergence and accommodation. When Dr. Whitaker refers to the associated activity of both faculties as a "reflex," he is begging the question. It would seem that the necessity for simultaneous operation on the part of the convergence and the accommodation under normal conditions, has resulted in a certain, varying degree of habit-formed, mutual response, so that if one is stimulated, the other responds at certain times and under certain circumstances. We believe it wrong, however, to refer to this as a reflex, as the latter presupposes an exact, mathe-

matical relationship between stimulus and response.

The table referred to "is obtained," writes Dr. Whitaker, "by taking 12 of accommodative-convergence being stirred up by 1.50 of accommodation. By dividing 12 by 6, we have 2 prism D.; also (dividing) 1.50 by 6, we have 0.25 D. Thus we have for every 2 of accommodative-convergence an equivalent of 0.25 D. of convergence-accommodation, all depending on which is taken first or which is the controlling factor."

All this I believe is sound mathematics but poor science. For even admitting that 1.50 D. of accommodation produces 12 prism D. of accommodative-convergence, as a standard, why must it necessarily follow that 1/6 of one will produce 1/6 of the other? This a priori assumption of a fixed proportionate relationship is not justified by clinical experience, which teaches us that to a great extent, each individual has built up his own peculiar relationship without reference to a fixed dogma.

Furthermore it is well to remember Savage's statement that "whatever may be true of other associated brain centers it appears that the center of the ciliary muscles and the third conjugate innervation center (convergence center) can have the associated impulse run in only one direction: that is from the former to the latter." Dr. Sheard is in agreement with this statement and remarks that "convergence cannot, except rarely induce accommodation." Hence, when we speak of "convergence-accommodation," we should remind ourselves that we mean the amount of accommodation that is associated with a given amount of convergence—not, as Dr. Whitaker (and, I presume, Dr. Tate) implies and explicitly states, namely, the amount of accommodation that is CAUSED by the given convergence.

It is pertinent in this connection also to recall Dr. Sheard's suggestion about the possible effect of fusion convergence, as distinct from accommodative-convergence, on the accommodation. "There must be an interplay of accommodative and fusional convergence whereby the convergence (in toto) makes possible a slightly greater dynamic refractive change under a given delivery of innervation to the accommodative mechanism." This conclusion seems definitely corroborated by the difference in accommodative amplitude displayed by eyes when (a) the fusion sense is operative and (b) the fusion sense is not operative. It is possible that the extent to which the fusion convergence influences the accommodation at any given distance varies among individuals, so that from this viewpoint also, the results will not tally with the table in Dr. Whitaker's article.

Regarding the third claim that the convergence-accommodation "includes the cramp" in a case of accommodative spasm is not valid and looks suspiciously like a piece of rationalization in an attempt to force every phenomenon into the pattern of a preconceived theory.

Dr. Whitaker seeks to substantiate this claim by the following analogy: "Hold your arm down at the side of the body. Assume this position to represent normal ciliary tonicity as the muscles of your arm have only a normal tonicity (provided your arm is not 'overtrained'). Now, bend the arm at the elbow and touch the mouth. When the arm is in this position assume that 1.50 D. are in force (provided, of course, the ciliary muscle and associated structures were in use). Then either assume or develop a hypertonicity of the arm muscles and now the arm will not relax to the side but instead remains two-thirds bent or opposite the chest. This condition represents ciliary hypertonicity of say 1.00 D. Now attempt to touch the mouth again as before. You will find that the hand will stop at the mouth and not fly past behind the head (thus representing 2.50 D. of accommodation). In other words, even though a hypertonicity is present, the hand is only raised to the mouth (representing 1.50 D. of accommodation). This is what is meant by the statement, 'the cramp is included at the near point': is not the hypertonicity in the arm muscles included in the further contraction to the mouth (0.50 D.)? Is it clear now that in a pair of eyes having a 'cramp' of 1.00 D., the normal convergence-accommodation of 1.50 D. supplies only 0.50 D. (which, together with the 1.00 D. spasm, totals the required 1.50 D.)?"

The analogy is unfortunate for two reasons:

First and foremost, the arm is a group of *voluntary* muscles while the ciliary muscle that controls the accommodation is *involuntary*. The former is therefore under the control of the will which can deliberately guide the action of the arm in a case of spasm or hypertonicity of one of the muscles. The latter is not thus amenable to the will.

Secondly, the action of raising the hand to the mouth involves the work of many muscles and if one or only a few of them are in a state of hypertonicity, the remaining muscles can compensate for the overcontraction by a proportionate lessening of contraction. (It is obviously difficult if not impossible to develop simultaneously the same degree of hypertonicity in all the muscles.) In the case of the ciliary muscle, however, there are no supplementary muscles that work in conjunction with it and that can compensate for its abnormality.

From a clinical or therapeutic viewpoint, there is also little corroboration for this theory. According to the latter, an emmetrope who develops a spasm of 1.00 D. will exert not 4.00 but the regular 3.00 D. of accommodation at 13″. If this is true, then there is no reason why such a person should feel the slightest distress as, to all intents and purposes, he is an emmetrope WITHOUT the spasm. Yet we know that asthenopia is almost always associated with spasm and the wearing of the convex lenses equal in power to that of the "cramp" (say in emmetropia) commonly eliminates the symptoms of distress. What better explanation than the usual one, namely, that

the lenses absorb the overload of excess accommodation?

The only other possibility of ocular discomfort if we accept the theory, is that arising from the disturbance in the relationship between convergence and accommodation. That such a disturbance is not sufficient to account for the usual distress associated with accommodative spasm is indicated by the fact that the majority of uncorrected myopes do not suffer from asthenopia, although the relationship between their convergence and accommodation is not normal.

The writer wishes to remark in passing that there seems to be a dangerous amount of rationalization in Dr. Whitaker's claim that the amount of convergence-accommodation at 13″ is 1.50 D. no matter whether the patient has physiological orthophoria or physiological esophoria and that it is not increased by a supernatural innervation "from the convergence-accommodation reflex arc." Dr. Whitaker's only published defense of such unusual restriction is that a similar condition is found in the physical world and he compares the ciliary body to a power tube in a radio circuit.

Dr. Whitaker does not have to go outside the animal world if he wishes to establish an analogy. If the heart of a frog is made quiescent by means of a ligature tied around the junction of the sinus with the right atrium, it can be made to contract if it is artificially stimulated; in which case any stimulus at all, no matter how strong or how weak, will produce the same degree of contraction.

It is obvious, however, that an analogy does not constitute proof, but merely suggests that the theory is not a far-fetched one, and Dr. Whitaker offers no corroboration of, or evidence for, his astonishing claim in the article. It is difficult to believe that in a case of high esophoria associated with high hyperopia, the amount of convergence-accommodation so-called at 13″ is not greater than normal. The proof that the excess convergence is caused by excess accommodation is shown by the fact that the wearing of the correction for the hyperopia frequently eliminates the imbalance, as thousands of records of children's cases will demonstrate. If the amount of accommodation associated with the convergence at 13″ were not above normal, in these cases, why should it cause esophoria or esotropia?

In conclusion, the writer wishes respectfully to call attention to what he regards as a serious defect in our published research work*. It is this: rarely will you find a careful report of the number of cases examined or experimented upon in support of the claims advanced. We are overwhelmed with theory but of published facts

*This criticism is made with full realization of the thousands of eyes patiently examined by Dr. Tate before he formulated his theory. The optometrist is essentially a mathematician. He should write not in terms of abstract ideas but in terms of graphs, statistics, percentages. It is for this very reason that Dr. Sheard's book on dynamic skiametry remains the most able and authoritative book on the subject that has been published. It would be an excellent training for research work if optometry courses included a course in statistics.

there is nary a trace. And yet nothing can be more certain than this: that OPTOMETRY WILL NEVER BE ABLE TO ATTAIN A POSITION OF AUTHORITY AMONG SCIENTIFIC MEN UNLESS IT MAKES USE OF, AND HABITUALLY EMPLOYS, THE STATISTICAL AND QUANTITATIVE METHODS OF ANALYSIS! It is not enough to say: "We have found in thousands of cases * * *." It is high time that we get into the habit of stating the exact number of cases and classifying them impartially. If the research worker in optometry spent the next few years in doing nothing but collecting and arranging data, he would be performing a tremendous and much needed service to optometry.

Finally, it is a pity that so many optometric articles are published that make no mention of the standard works on the subject discussed. Not only does a scientific paper lack historical perspective by failing to consider what has been said before on the topic, but the issues raised by the pioneer workers and established authorities are not squarely met, when the writer disagrees with their conclusions. Then again, a careful investigation might reveal the fact that some new idea that had occurred to the optometrist had already been considered and definitely disproved by a former investigator. Finally, it would not be a bad idea, after the research worker has gathered his statistics, to compare them with the statistics compiled on the same subject by other scientists.

It is relatively easy to invent a theory. It is the hardest thing in the world to accurately observe and accurately record a single fact. What a boon it would be for optometry if every optometrist in the country devoted himself to fact-observing and fact-recording and sent his data in regularly to the optometric journals for a single year! The latter could perform no greater service to the profession than by classifying and publishing the data for future and permanent reference.

DR. PHILIP POLLACK,
342 SEVENTH AVE.,
BROOKLYN, N. Y.

AMERICAN JOURNAL OF OPTOMETRY

VOL. 7 MARCH, 1930 NO. 3

EDITORIAL STAFF

DR. CAREL C. KOCH, Editor
209 Medical Arts Bldg.
Minneapolis, Minn.

DR. JACK I. KURTZ, Associate Editor
209 Medical Arts Bldg.
Minneapolis, Minn.

Original papers, scientific communications, clinical reports, society proceedings, books for review, and correspondence should be sent to the Editor.

Annual Subscription, $3.00 in Advance. Canada, $3.50. Foreign, $4.00.
Single Copies, 40c.

Copy of advertisements must be sent in by the tenth of the month preceding their appearance. Subscriptions, applications for single copies, communications with reference to advertising or other business should be addressed to the Business Manager, Dr. Jack I. Kurtz, 209 Yeates Building, Minneapolis, Minn.

Published Monthly by the
American Journal of Optometry Publishing Association.

The Journal has no objection to the reprinting by other magazines of any of its articles, provided such reprints are properly credited to the American Journal of Optometry.

OPHTHALMOSCOPIC RECORDS

The following chart has been prepared to enable the examiner to record an accurate word-picture of the fundus, in the shortest possible time. Immediately after viewing the media and fundus of one eye the examiner can, by turning to his record chart upon which this data is printed, with a few strokes of his pen, leave a permanent and accurate record of the fundus at the time of the examination. He then returns and examines the media and fundus of the other eye, thus also giving both the patient and himself a brief respite while the notations are being recorded. A similar chart for the other eye is then filled out and the examiner has for his records a complete set of data to which he can refer and note subsequent changes should any occur.

In this connection it is interesting to note that there is, today, a growing tendency among optometrists to have a specially trained assistant present in the refracting room while the examination is taking place. This assistant prepares the patient for the examination; places the apparatus in proper sequence, adjusting same to proper height and P.D., and also usually records the findings as the various tests are made. In using this suggested ophthalmoscopic record chart the examiner would merely memorize the printed data on the card which would be held by the assistant, and as the ophthalmoscopic examination proceeds would quietly announce to the assistant, point after point, the assistant recording the data at once, while the fundus is being viewed.

C. C. K.

Ophthalmoscopic Record

Fundus Notation. Right Eye:

The disc is { round / oval / elliptical } in shape, { pale / medium / dark }, rose reddish in color with a { broad / medium / narrow } { clearly / average / poorly } defined edge, the tendency being to merge off towards the { nasal / temporal } side. The cup is { small / moderate / large } it being { easy / difficult } to see, and is { very deep / average / shallow }. The choroidal ring shows { very strongly / clearly / faintly } on the { nasal / temporal } side, with the scleral ring showing at the..... The vessels are approximately..... in number, their course being....., and their pulsation quite { moderate / marked }. The macular region is rather { easy / difficult } to discern, the general color being a { pale / medium / dark } reddish, with { one / no } { small / medium / large } bright foveal dot being visible. The general fundus color is of the { feeble / moderate / pronounced } { blonde / brunette } type. The outstanding features of this fundus being as follows:.....
.....
.....and have been sketched below.

Media. Right Eye:

The media is { clear / dull / cloudy }, the exudate being in the { anterior / posterior } chamber.

The lens is { transparent / partially opaque / opaque }, the opacities being sketched as follows:

A CORRECTION FOR PRESBYOPIC REFRACTIONISTS TO BE USED IN MAKING SKIAMETRIC TESTS

In the effort to overcome the problem which naturally arises when a middle-aged astigmatic and naturally presbyopic refractionist wishes to conduct a skiametric examination, Dr. Ernest Thompson, ophthalmologist of Sterling, England,* worked out the following formula for his own use, regarding which he says:

> "My own experience is this. I have worn cylinders since early in professional life, and in due time sphero-cylinders in bifocal form. Eventually it came about that if I employed my ordinary bifocals for retinoscopy the shadow was not sharply defined with either the distance or the near portion and, in addition, the line of junction was constantly coming in the way. If no glasses were worn the case was worse, because neither the shadow nor the lens numbers could be clearly seen, while if a note were possible to write probably it could not be read when required. Some fifteen years ago the combination of presbyopia and astigmatism became so troublesome, at a time when retinoscopy formed a very large part of my work, that I had to get over the difficulty somehow or other. This was done by means of a special pair of retinoscopy glasses. The right lens is single and designed exactly to focus the shadow at my own working distance and is altered in strength as required by the years. The left lens is bifocal for distance and near. One might suppose that this arrangement would prove uncomfortable for all purposes other than retinoscopy, but, in my own case at any rate, this has not been such as to outweigh the great advantages of being able to do the retinoscopy and to see to write and read without changing glasses. Headaches have not been caused to any appreciable extent. Naturally, should it be necessary to examine an eye, or anything else, critically, with binocular vision, one must change glasses but, in the course of say, a morning's refraction, the occasional change required is as nothing to the repeated change which is otherwise necessary."

C. C. K.

*The British Journal of Ophthalmology. Vol. XIV, No. 2, p. 92, 1930.

ABSTRACTS

CYCLOPLEGICS. W. G. Maybee. (Editorial). The Canadian Optometrist. Vol. X, No. 6, p. 174. 1928.

Modern instruments and methods, claim Maybee, have made it entirely unnecessary to employ cycloplegics for the purpose of detecting and correcting errors of refraction. On this Maybee is not writing at random, having used various cycloplegics and mydriatics, for a number of years, and having voluntarily discarded them, many years ago, as unnecessary, unscientific and dangerous. Drugs cannot improve on the information secured by drugless methods. Without drugs as with them more errors can be uncovered, and a deeper correction can be found, than the patient can tolerate. With drugs the distended pupil brings into use peripheral portions of the crystalline lens which are not used when the pupil resumes its ordinary size. This unnaturally large pupil renders objective and subjective examination less exact, as variable deductions have to be made. Accommodation is repressed to a much greater degree than possible, when the effect of the drug has passed away. Accommodative power cannot be measured nor can the most necessary co-related convergence. Without drugs all functions of the eyes may be corrected while they are "live" eyes under the conditions in which they are required to work. He says further that this is too large a subject to be discussed pro and con but the list of eminent medical authorities who have practically ceased to use "drops" in their refraction work would be illuminating. C. C. K.

AMBLYOPIA. O. Burton. The Commonwealth Optometrist. (Australia). Vol. X, No. 7, pp. 266-267. 1928.

Ametropic, Traumatic, Reflex, Toxic, Hysterical Amblyopes as well as Ambloypia ex anopsia are mentioned in this paper by Burton. He first divides the subject into congenital and acquired types. Regarding the congenital types of amblyopia he says, "When vision is found to be sub-normal after all refractive errors have been corrected, and from early childhood, we diagnose the case congenital amblyopia. There may only be one eye affected, possibly Strabismus, and we hesitate whether the amblyopia was congenital or acquired, and possibly there is not much hope of coming to a conclusion. Injury at birth, Hypermetropia, Compound Hypermetropia, Astigmatism may render both eyes Amblyopic and pathological conditions may have played a part." He further claims that acquired amblyopia is easier to determine and originates from various causes.

Disuse (Anopsia) change in the fundus, the effect of certain drugs, excessive exposure to bright light. Disease, poisoning, traumatism, hemorrhage, carious teeth, nasal affections, scotoma, hemeopsia, overwork, eyestrain, abuse and many other sight-destroying agents coming under the heading of pathological conditions, which produce amblyopia. C. C. K.

ROD PALPATORY METHOD FOR THE EXPLORATION OF SOME OF THE ORBITAL CONTENTS AND OF THE SURFACE OF THE EYEBALL. M. Schoenberg. Archives of Ophthalmology. September, 1927.

In order to diagnose a myositis of one or more of the ocular muscles an episcleritis situated way back or a periostitis of the orbital walls, Schoenberg claims it is necessary to palpate the eye and orbit with a glass rod similar to that used for inserting ointment. Palpation is made first through the lids and secondly, after cocainization, through the conjunctiva. The method must be employed with great care and gentleness, but the author is of opinion that valuable information may be elicited by its means, particularly in patients whose eyes continue to ache in spite of adequate correction of their error of refraction. T. O. B.

ALTERNATING SUSPENOPSIA. F. McFadden. The Optometric Weekly. Vol. XIX, No. 30, pp. 1063-1064. 1928.

McFadden cites a case of alternating suspenopsia in this paper, giving his methods of making the diagnosis and the treatment he prescribed for the patient. He claims that the ocular defect of suspenopsia is involuntary, the patient having no control over the frequency of the suspensions, nor are they frequently even aware that vision has been suspended in one eye or the other during the short periods the suspension occurs. T. O. B.

RESULTS OF MOTORISTS' VISUAL SURVEY. F. Gonder. The Optical Journal and Review. Vol. LXII, No. 19, p. 44. 1928.

2,456 persons had their eyes examined in a motorists' visual survey throughout Nebraska during the month of August, says Gonder. The surveys were conducted by the members of the Nebraska State Association of Optometrists, with the following results: Of the 2,456 persons examined, 39 were considered unfit to drive. Of this 39, 28 could have their vision corrected with lenses in such manner as to enable them to pass subsequent visual tests. Two had uncorrectable defects, five were color blind and four had such constricted fields as to make them unfit to drive a motor car. C. C. K.

ANNOTATIONS AND SOCIETY PROCEEDINGS

The American Journal of Optometry is the Official Organ of the American Academy of Optometry, as well as the Organ of the Arkansas, Delaware, Indiana, Iowa, Maine, Maryland, Michigan, Minnesota, Nebraska, North Dakota, Oklahoma, Pennsylvania, South Dakota, Vermont and West Virginia Optometric Associations.

The following gentlemen have consented to supply items of interest from their respective sections, acting in the capacity of

ASSOCIATE STATE EDITORS

DR. E. B. ALEXANDER
Duncan, Okla.
DR. A. S. ANDERSON
Minot, N. D.
DR. J. F. ANDREAE
Baltimore, Md.
DR. R. W. BENNETT
Indianapolis, Ind.
DR. C. H. DEGRAFF
Monroe, Mich.
DR. L. P. FOLSOM
South Royalton, Vt.
DR. D. L. GALLAGHER
Parkersburg, W. Va.
DR. D. A. KINNEY
Charles City, Ia.
DR. A. J. LARGE
Winona, Minn.
J. J. LIVINGSTON
Little Rock, Ark.
DR. M. B. MEYER
Wilmington, Del.
DR. J. K. MORRIS
Erie, Penn.
DR. C. A. PERRIGO
Norfolk, Neb.
DR. D. E. PLAISTED
Lewiston, Me.
DR. H. N. SMITH
Sioux Falls, S. D.
DR. H. R. SPITLER
Eaton, Ohio

PENN STATE COLLEGE OF OPTOMETRY EXPANDING

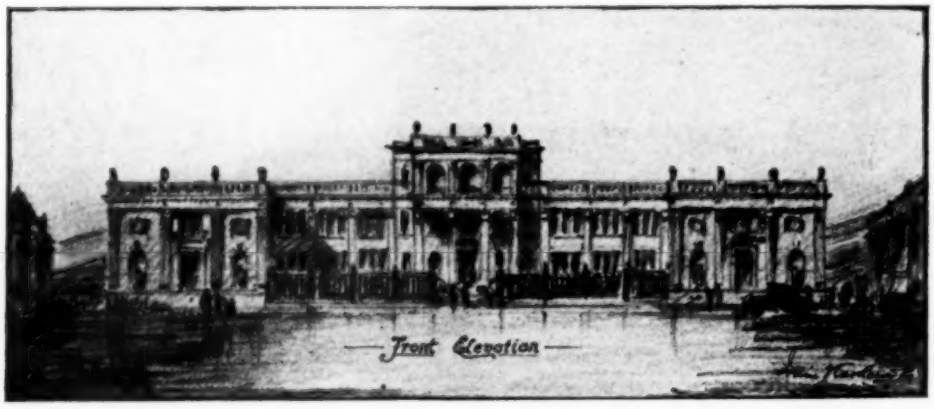
The Pennsylvania State College of Optometry has made tremendous progress during the few years of its existence. It was originally established by a group of fifteen interested optometrists who had a vision of an independent optometric college. This group has grown to four hundred during the few short years of the school's existence. The faculty grew from four to thirty members. The student body has grown from twenty to one hundred and thirty and nearly an equal number of students was turned away during the last two years due to lack of accommodation.

The optometrists in the East back of this college as well as the members of the faculty are to be congratulated upon such wonderful accomplishments. These men of vision and courage made it possible for a dream to come true. But now they are confronted with a new problem and this is not merely their own local problem but one of the entire profession of optometry as well. What is this problem—*it is a need for expansion.* While some optometric schools (so it is claimed) do not have a sufficient number of students register each year, this college finds it impossible to accommodate all the students who seek admission and many must be turned away. This is not merely a loss to the school, but it is even a much greater loss to the profession of optometry. At a time when many states feel that a serious situation exists, that fewer and fewer men are being registered each year to replace that great number of practitioners which we lose by death or retirement, we cannot and must not permit a condition like this to exist; where a large number of young

men who seek admission in this institution should be turned away annually. The optometrists in Pennsylvania and the New England states are doing all in their power to relieve this situation by providing proper educational facilities for students desirous of entering this profession.

Plan for New Optometry College and Hospital

Under the leadership of Dean Albert Fitch, Dr. Ed. F. Tait and many other members of the Faculty and Board of Trustees an ambitious program for the erection of a new optometry college and eye hospital has been worked out. The buildings are to be con-



structed in the most exclusive Fairmont Park district, which was set aside by the City of Philadelphia for public and semi-public buildings. The site for the building was purchased in part and the remainder was presented to the college by the City of Philadelphia. The plans for the college and hospital buildings were drawn by the architects so that they would conform with the other public buildings on the parkway as can be seen from the accompanying picture. One can only get a better idea of what the proposed college will be when he considers the neighboring buildings. Close by will be built a thirty-five million dollar art museum and to the right the six million dollar Masonic Temple; to the left will be the beautiful Rodin Museum, just a little below will be the huge new building of the Free Library of the City of Philadelphia; just next to this will be the site of the ten million dollar "Palace of Justice" to be erected by the City of Philadelphia. On the opposite side of the parkway and nearest to this site will be the site of the building of the Board of Education; just below this will be the site of the magnificent building shortly to be erected by the Franklin Memorial, Inc., and Franklin Institute; next to this will be buildings of the Academy of Natural Sciences, while just below this will be the

famous Wills Eye Hospital and Graduate School.

To build an optometry college amongst these buildings will add recognition and prestige to the profession of Optometry. If these plans be carried through successfully, it will benefit optometry and optometrists in every state in the Union. We must all help build a real home for optometry. Dean Albert Fitch has a very unique plan as to how individual optometrists and organizations can derive many benefits from this institution. For further particulars write to him at Penn State College of Optometry, 1809 Spring Garden Street, Philadelphia, Pa. J. I. K.

* * * * * * *

MAIL ORDER CONVICTION

A peddler employed by a Chicago mail order house was recently convicted of practicing optometry without a license by the Missouri Court of Appeals, according to a statement appearing in the Journal of the A. M. A. which we quote in full as follows:

"Practice of Optometry and the Sale of Glasses Distinguished.—Etzenhouser took orders in Missouri for eye glasses and spectacles, to be supplied by his principal, a Chicago optical company. He made no examination of the eyes of a prospective purchaser, but he supplied him with a device by which the customer might determine for himself the kind of lenses needed. Etzenhouser, on receipt of one dollar as part payment for the eye glasses or spectacles desired, ordered them from Chicago, and when completed they were mailed directly to the purchaser, C. O. D. After conviction of practicing optometry without a certificate of registration, Etzenhouser appealed to the Kansas City Court of Appeals. He contended that he was not engaged in the practice of optometry within the meaning of the law and moreover that the transaction constituted interstate commerce. It may be true, said the Court of Appeals, that Etzenhouser himself did not manipulate the device that he furnished to the prospective customer, but he did furnish it and he either explained how to operate it or referred the customer to the printed directions on it. His relation to the prospective customer was not greatly different from that of an oculist who places a chart on the wall opposite a patient and then manipulates lenses in front of the patient's eyes. In either case, the person whose vision is being tested must himself give the ultimate information as to when he gets the best vision. Etzenhouser was prosecuted not for the sale of eye glasses or spectacles but for acts which were done prior to the sale and which therefore were not within the purview of interstate commerce. The jugment of the court below was affirmed.—State v. Etzenhouser, (Mo.), 16 S. W. (2d) 656."

* * * * * * *

NORTH DAKOTA STATE BOARD OF OPTOMETRY

Dr. H. Kornmesser of Jamestown, N. D., Secretary of the North Dakota State Board of Optometry announces that the next meeting of this State Board of Examiners will be held on April 7th and 8th at the Great Northern Hotel in Devils Lake. Applicants are referred to Dr. Kornmesser for registration.

* * * * * * *

UNIVERSITY OF CALIFORNIA

The division of Optometry of the University of California announces complete new laboratory equipment for the use of the students as well as much new refracting room equipment. Each student now has at his disposal the most modern refractive apparatus and uses this apparatus from day to day in the Clinic.

It is interesting to note that with the increased clinical facilities comes increased recognition to this school of the University of California. Within the past few months the Department of Optometry has been requested to assist in the solution of the auto headlight problem; eye strain in connection with reading of photostat copies; the measuring of depth intra-ocular growths and many questions relating to ocular projecting devices.

* * * * * * *

MINNESOTA OPTOMETRIC ASSOCIATION

The annual meeting of the Minnesota State Association of Optometrists was held at the St. Francis Hotel the week of February 16th. The first day was devoted entirely to the routine of business activities of the Society during which it was decided to invite the A. O. A. to have its annual gathering at the Twin Cities during 1931. The Optometrists Free Eye Clinic as established by the Hennepin County Optometric Society was discussed and similar free clinics to be sponsored by our State Association were suggested. All the officers for 1929 were re-elected and introduced at the annual banquet at which Mayor Hodgson of St. Paul was the chief speaker.

Educationally, this meeting was an outstanding success. Dr. A. M. Skeffington of the Graduate Foundation spent five full days in constant clinical sessions. These sessions were very much enjoyed and all present felt that much has been accomplished to improve their techniques of practice.

* * * * * * *

BETTER VISION INSTITUTE

Mr. Ernest Gaunt, Secretary of the Better Vision Institute announces that the material on Occupational Analysis is now ready for distribution to the new members of this organization. This is the first piece of work the officers have assigned to the Institute and will be followed from time to time with other activities all of which should benefit the various elements in the optometric work.

* * * * * * *

NORTHWEST IOWA ASSOCIATION

The Northwest Iowa Association of Optometrists has just completed a week under Dr. A. M. Skeffington of the Graduate Clinic Foundation. This is Dr. Skeffington's second week in Sioux City and fourteen of the attending clinicians have already signed to be present at the third week to be held in February, 1931. According to Dr. F. L. Hoefle, the Clinic was successful in every way.

* * * * * * *

SOUTH DAKOTA ANNUAL CONVENTION

The annual convention of the South Dakota Optometric Association will be held at Mitchell on the 13th, 14th and 15th of April. The principal speakers will be Prof. Ralph Barstow who will lecture on Business Psychology; Dr. J. Neumueller and Dr. J. C. Copeland.

* * * * * * *

LECTURE IN ABERDEEN

Dr. R. M. Peckham formerly of the Los Angeles School of Optometry will lecture on the Correction of Squint by means of the Arneson-Peckham Technic, in Aberdeen, South Dakota, on Sunday, March 30th. All South Dakota Optometrists are urged to be present.

* * * * * * *

OKLAHOMA ASSOCIATION CONVENTION

Dr. E. B. Alexander, Secretary of the Oklahoma Association of Optometrists announces that the annual convention of the association will be held in Oklahoma City at the Huckins Hotel on the 21st and 22nd of April. A program of the activities will be mailed all members.

* * * * * * *

MISSISSIPPI VALLEY SOCIETY

A meeting of the Mississippi Valley Optometric Research Society was held at the Nachusa Tavern, Dixon, Illinois, Tuesday evening, March 4th. Election of officers was held and the following elected to office: President, Dr. O. M. Myers, Rock Island, Illinois; Vice-President, Dr. W. G. Edwards, Rock Island, Illinois; Secretary and Treasurer, Dr. J. W. Barrett, Freeport, Illinois; Executive Council, Dr. Geo. McGraham, Dixon, Illinois, and Dr. Eno Musk, Fulton, Illinois.

* * * * * * *

ORTH
AR